



**UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office**

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/002,170	12/31/97	BOHR	M 042390F4220

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EXAMINER
GUERRERO, M

ART UNIT	PAPER NUMBER
2822	

DATE MAILED: 11/07/00

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/002,178

Applicant(s)

BOHR, MARK T.

Examiner

Maria Guerrero

Art Unit

2822

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Status

- 1) ☒ Responsive to communication(s) filed on 15 August 2000.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☐ All b) ☐ Some * c) ☐ None of the CERTIFIED copies of the priority documents have been:
1. ☐ received.
2. ☐ received in Application No. (Series Code / Serial Number) _____.
3. ☐ received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. & 119(e).

Attachment(s)

- 15) ☐ Notice of References Cited (PTO-892)
- 16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 18) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 19) ☐ Notice of Informal Patent Application (PTO-152)
- 20) ☐ Other: _____

DETAILED ACTION

This Office Action is in response to the Request for a CPA and the Amendment filed August 15, 2000.

Claims 21-30 are canceled.

Claims 1-20 are pending.

Continued Prosecution Application

The request filed on August 15, 2000 for a Continued Prosecution Application (CPA) under 37 CFR 1.53(d) based on parent Application No. 09/002,178 is acceptable and a CPA has been established. An action on the CPA follows.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

Claims 1-4, 6-8, 10-19 are rejected under 35 U.S.C. 102(e) as being anticipated by Efland et al. (U.S. 6,025,275).

Efland et al. discloses forming a dielectric layer 22 over a metal interconnect layer on a substrate, the metal interconnect layer including a bond pad and a metal member space apart from the bond pad by a gap (fig. 1A), the dielectric layer 22 may be composed of several layers of dielectric having different makeup, the dielectric layer 22 may be oxide and nitride (or polyimides) (col. 3, lines 40-45, col. 5, lines 25-30).

Efland et al. also discloses forming an opening (fig. 1A). Efland et al. teaches forming a conducting barrier layer 30 over the dielectric layer, over sidewalls of the opening, and over the exposed top surface of the bond pad (fig. 1B, the formation of a continuous seal is inhered). Furthermore, Efland et al. shows an electroplating process to form a copper lead 50 (fig. 1C, col. 5, lines 30-40).

In addition, Efland et al. discloses the dielectric layer 22 may be composed by several layers, it is inhered from the disclosure: the formation of a first, second and third dielectric layers.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 5, 9, 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Efland et al. (U.S. 6,025,275) in view of Byrne (U.S. 5,136,364).

Efland et al. discloses forming a dielectric layer 22 over a metal interconnect layer on a substrate, the metal interconnect layer including a bond pad and a metal member space apart from the bond pad by a gap (fig. 1A), the dielectric layer 22 may be composed of several layers of dielectric having different makeup, the dielectric layer 22 may be oxide and nitride (or polyimides) (col. 3, lines 40-45, col. 5, lines 25-30). Efland et al. also discloses forming an opening (fig. 1A). Efland et al. teaches forming a

conducting barrier layer 30 over the dielectric layer, over sidewalls of the opening, and over the exposed top surface of the bond pad (fig. 1B).

Efland et al. does not specifically show the barrier layer having a nickel-vanadium layer as claimed. Nevertheless, this is known in the art as evidenced Byrne.

Byrne '364 discloses forming: a substrate 10, a bonding pad 11, a two component passivation layer, a first dielectric layer (silicon dioxide), a second dielectric layer (silicon nitride), a third dielectric layer can be a polyimide layer (fig. 3-5, col. 2, lines 60-65, col. 3, lines 1-35). Byrne '364 also teaches forming an opening to exposed the top surface of the bonding pad, depositing a barrier layer (fig. 3). Byrne '364 discloses typically bumps are connected to the bonds pads. Byrne '364 also discloses a barrier layer comprising a nickel-vanadium layer (col. 2, lines 40-43).

It would have be obvious to a person of ordinary skill in the art to modify Efland et al.'s process by including a nickel-vanadium layer as taught Byrne. The modification would provide an improved copper interconnect structure.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maria Guerrero whose telephone number is (703) 305-0162. The examiner can normally be reached on Monday-Friday from 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, can be reached on (703) 308-4940. The fax phone number for this Group is (703) 308-7722.

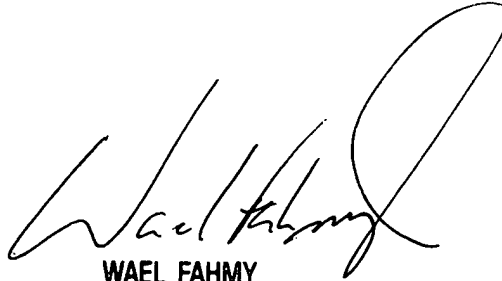
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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0956.

MG

November 3, 2000



Wael Fahmy
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800